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Discovery of Stenochilidae Thorell, 1873 (Araneae) in China, with description of a new species from Yunnan

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Discovery of Stenochilidae Thorell, 1873 (Araneae) in China, with description of a new species from Yunnan. - The family Stenochilidae is reported for the first time from China and a new species, *Colopea lehtineni* sp. n. (male and female), is described from the Xishuangbanna rainforest of Yunnan Province. The new species is close to *C. laeta* (Thorell, 1895) but differs in the shape of copulatory organs and in somatic characters.

Keywords: Spider - *Colopea* - rainforest - taxonomy - fauna.

INTRODUCTION

China has one of the most diverse spider faunas, at both the species and family levels. According to the latest compilation (Song *et al.*, 1999), the Chinese spider fauna comprises 2361 species belonging to 56 families. Since then six additional families have been reported from south and central China: Desidae Pocock, 1895 (Zhu *et al.*, 2006), Mysmenidae Petrunkevitch, 1928 (Yin *et al.*, 2004; Lin & Li, 2008), Ochyroceratidae Fage, 1912 (Tong & Li, 2007), Pimoidae Wunderlich, 1986 (Xu & Li, 2007), Symphytognathidae Hickman, 1931 (Tong & Li, 2006) and Tetrablemmidae O. P.-Cambridge, 1873 (Tong & Li, 2008); members of Cybaeidae Banks, 1892 and Miturgidae Simon, 1885 were known from China but treated in Song *et al.* (1999) as members of other families (Platnick, 2009). In addition, the subfamily Nephilinae Simon, 1894 was elevated to family level (Kuntner, 2006), and one family new to science, Sinopimoidae Li & Wunderlich, 2008 (Li & Wunderlich, 2008) has been described from Yunnan, southwestern China. Here we present a new family record, Stenochilidae Thorell, 1873, from southwestern China. Thus, the spider fauna of China currently comprises 67 families.

Among the 109 spider families recognized at present (Platnick, 2009), Stenochilidae is the 19th smallest, containing only 12 species in two genera, and has one of the smallest geographical ranges, from India to Fiji. Together with the Palpimanidae, the Stenochilidae belong to the superfamily Palpimanoidea (see Coddington *et al.*, 2004). Stenochilids were earlier treated as a subfamily of the Palpimanidae but then re-

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elevated to family level by Platnick and Shadab (1974) in a worldwide revision of the group. Soon afterwards, the Stenochilidae was revised by Lehtinen (1982), who described several new species and resurrected several species earlier treated as junior synonyms. In spite of these two revisions, the family remains very poorly known.

Stenochilidae can be easily distinguished from all other spiders by the following characters: Diamond-shaped carapace, elongate foveae constricted in the middle (Figs 2G, 3F; Forster & Platnick, 1984: fig. 310), well-developed anterior lateral spinnerets and strongly or totally (in males) reduced posterior median and posterior lateral spinnerets, and divided prolateral scopulae on tarsi, metatarsi and distal part of tibiae I and II (Platnick & Shadab, 1974). The latest diagnosis of this family and a comparison with the related families Palpimanidae and Huttonidae was provided by Forster & Platnick (1984).

As mentioned above, the Stenochilidae includes 2 genera and 12 species, of which *Stenochilus* includes 3 species and *Colopea* 9 species (Platnick, 2009).

An extensive survey of the spider fauna of the Xishuangbanna rainforest in southern Yunnan was carried out over a period of one year (June 2006 to August 2007) using various collection techniques like fogging, pitfall traps, trunk traps and direct searching. Among the spiders collected there we recognized 10 adult specimens and many juveniles belonging to an undescribed *Colopea* species. It seems to be one of the largest series of specimens of stenochilids ever reported from one locality. This allowed us to study variation in somatic and genitalic structures. While describing the new species, we recognized an additional character of the family that was overlooked by other authors.

MATERIAL AND METHODS

Specimens were examined using a SZX12-Olympus stereomicroscope. Details were studied under an Olympus BX51 compound microscope. All illustrations were made using a drawing tube. Photos were made with an Olympus C7070 wide zoom digital camera mounted on an SZX12-Olympus dissecting scope. Genitalia were examined and illustrated after being cleared in lactic acid, and the vulvae were stained by Amido Black 10B.

All measurements were taken using an Olympus BX51 compound microscope and are given in millimeters. Leg measurements are given as: Total length (femur, patella, tibia, metatarsus, tarsus). Leg segments were measured on their dorsal side.

All types and other material are deposited in the Institute of Zoology, Chinese Academy of Sciences in Beijing (IZCAS) and in the Muséum d'histoire naturelle in Geneva (MHNG). Type specimen photos of the species included in this paper can be viewed on the website http://www.ChineseSpecies.com, created and maintained by Li & Wang (2009).

Abbreviations: ALE, anterior lateral eyes; AME, anterior median eyes; CH, clypeus height; OL, opisthosoma length; OW, opisthosoma width; CL, carapace length; CW, carapace width; PLE, posterior lateral eyes; PME, posterior median eyes; TL, total length.

TAXONOMY

Family **Stenochilidae** Thorell, 1873
Genus ***Colopea*** Simon, 1893

TYPE SPECIES: *Stenochilus pusillus* Simon, 1893 from Luzon, the Philippines, by original designation.

DIAGNOSIS: Species of *Colopea* can be easily distinguished from those of *Stenochilus* by the strongly modified distal segments of legs I-II, the less distinctly undulating carapace margin, and the smaller size (Platnick & Shadab, 1974; Lehtinen, 1982). Males of the two genera differ by the absence of a bulbal apophysis in *Colopea* (one apophysis in *Stenochilus*), while females have almost indistinguishable external genitalic plates.

COMMENTS: In most earlier descriptions of copulatory organs in Stenochilidae a rather uncommon feature was not mentioned. Only Lehtinen (1982) mentioned that in *Colopea* the male bulb has no spermophore (= ejaculatory duct *sensu* Lehtinen, 1982), but just a sac-like structure, which in some males occupies a large part of the bulb (Lehtinen, 1982: figs 25-26, 28-29, 31-33 and Platnick & Shadab, 1974: figs 19-21). In some males this sac is collapsed, seemingly due to the absence of sperm inside. Although Lehtinen (1982) thought that this character is unique, the lack of a spermophore can be found in several other spider families: Most Oonopidae (except *Orchestina* s.l.), at least some Tetrablemmidae, some Orsolobidae, Pholcidae and seemingly some Palpimanidae (Otiothopinae). We had no possibility to study *Stenochilus*, but judging from illustrations in Platnick & Shadab (1974: figs 10-12) it may have a spermophore. The absence of spermophores is a loss that occured in several families independently.

An additional character often overlooked in *Colopea* is the presence of the same type of hairbrush on the retrolateral side of the female palpal tarsus and on the male cymbium. Such a brush was shown for the female of *C. xerophila* (Lehtinen, 1982: fig. 24).

Although Lehtinen (1982) considered Stenochilidae to be primitive spiders, many characters in this group are strongly derived: Lack of cribellum, lack of claw on female palp, lack of embolus (sclerotised embolus) and spermophore in male palp in *Colopea*, presence of medially constricted fovea on carapace.

DISTRIBUTION: Myanmar, China, Fiji, Indonesia, Malaysia, New Guinea, Philippines, Singapore, Thailand, Vietnam (Platnick & Shadab, 1974; Lehtinen, 1982) and northern Australia, Queensland (Forster & Platnick, 1984).

Colopea lehtineni sp. n. Figs 1-4

MATERIAL: Holotype, in IZCAS; ♂; primary tropical seasonal rainforest in Menglun Nature Reserve (alt. 744 m, 21°57'N, 101°13'E), Xishuangbanna rainforest, Yunnan Province, China, coll. G. Zheng, 16.II.2007. – Paratypes in MHNG; 1♂, 2♀, from the type locatility, coll. G. Zheng, 25.XII.2006, 12.II.2007. – Paratypes in IZCAS; 2♂, 4♀; Xishuangbanna Tropical Botanical Garden (alt. 558 m, 21°55' N, 101°16' E), Menglun Town, Mengla County, Yunnan Province, China; coll. G. Zheng, 24.XII.2006, 11.II.2007, 25.XII.2006, 20.VII.2007.

ETYMOLOGY: The specific name is a patronym in honor of Dr Pekka T. Lehtinen; noun (name) in genitive case.

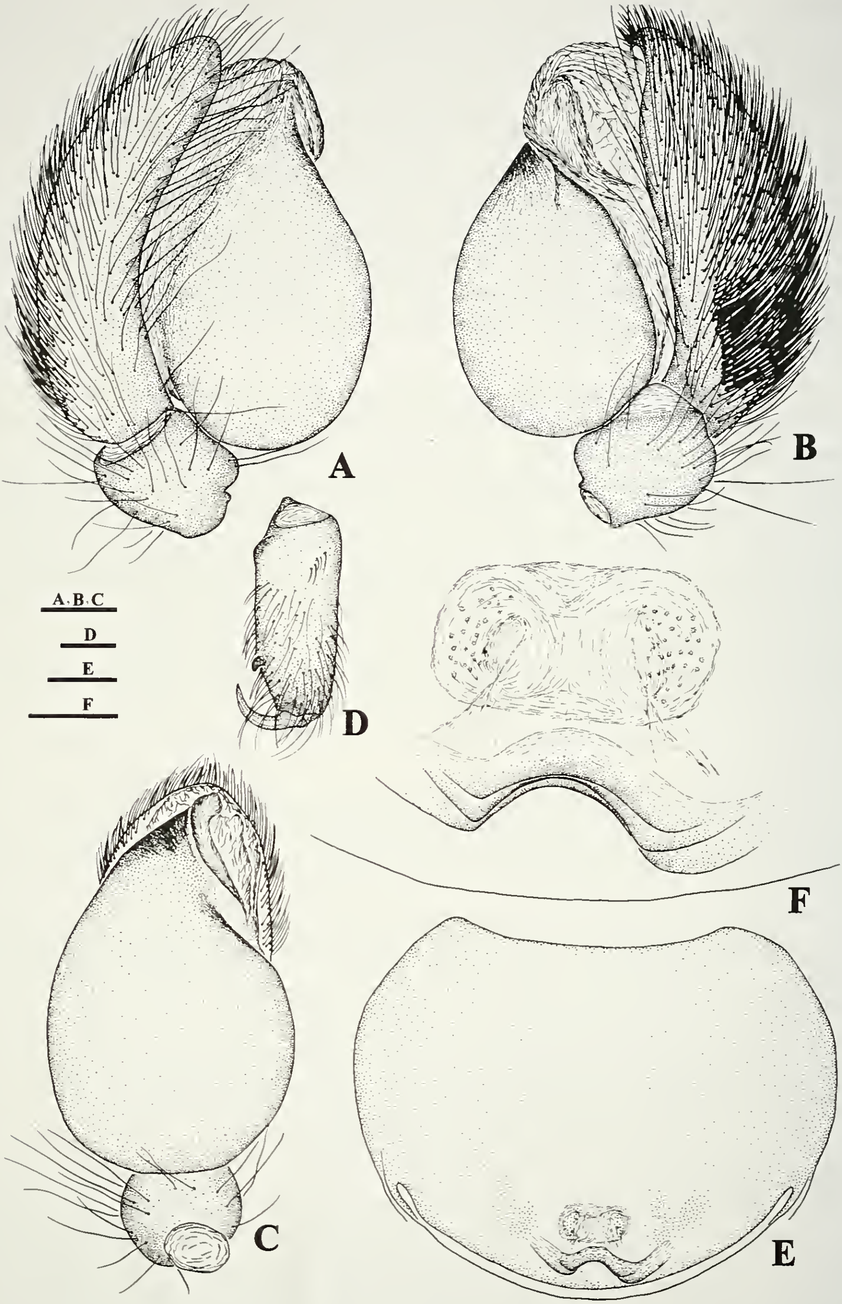

FIG. 1. *Colopea lehtineni* sp. n. (A) Left palp of holotype, prolateral view. (B) Same, retrolateral view. (C) Same, ventral view. (D) Right chelicera of male of holotype, posterior view. (E) Pulmonary plate of female paratype from Xishuangbanna Tropical Botanical Garden, dorsal view. (F) Vulva of same female, dorsal view. Scale bars: A-E = 0.2 mm, F = 0.1 mm.

DIAGNOSIS: The new species resembles *Colopea laeta* (Thorell, 1895) in its genitalia, but can be separated by somatic characters: 1) the carapace in both species has a different microsculpture, with a less granulous cuticle in the new species (Figs 2A, G, 3D, F; cf. Lehtinen, 1982: fig. 6); 2) the posterior part of the fovea in the new species is wide and oval (Figs 2G, 3F), not long and narrow as in *C. laeta* (cf. Lehtinen, 1982: fig. 6); 3) the ocular area in the new species is wide and oval, with the PME oval an slightly elongate (Figs 2F, 3E), while in *C. laeta* the ocular area is almost as long as wide, and the PME are very large and less elongate (cf. Lehtinen, 1982: fig. 6); 4) the new species is smaller than *C. laeta* (carapace 2.44 long in ♂ and 3.22 long in ♀).

The new species has a similar size as *C. xerophila* Lehtinen, 1982 but a different eye arrangement, carapace microsculpture, and scopula on metatarsus and tarsus I (cf. Lehtinen, 1982: figs 5, 19)

The new species can be distinguished from the geographically close *Colopea malayana* Lehtinen, 1982 by its vulva (Figs 1E-F, 2B) and by a distinct dark reddish grey pattern dorsally on the opisthosoma; it differs from *C. virgata* Lehtinen, 1982 by the shape of its vulva and palpal cymbium, by the long and narrow anterior part of the fovea and by the eye arrangement.

DESCRIPTION OF MALE (measurements of holotype): TL 4.55. CL 2.25, CW 1.60; OL 2.30, OW 1.65. Eye measurements: AME 0.11; ALE 0.11; PME 0.11; PLE 0.09; AME-AME 0.08; AME-ALE 0.01; ALE-PLE 0.03; PME-PME 0.10; PME-PLE 0.01. Eye pattern similar to that of C. malayana; AME subequal to ALE in size, but circular, four-fifths of their diameter apart; PME oval, subequal to AME in size, almost one diameter apart. CH 0.14. Leg measurements: I 4.70 [1.55, 0.95, 1.20, 0.45, 0.55]; II 4.70 [1.40, 1.00, 1.15, 0.55, 0.60]; III 3.45 [1.05, 0.55, 0.80, 0.50, 0.55]; IV 4.70 [1.45, 0.65, 1.25, 0.80, 0.55]. Leg formula: I-IV-II-III (from longest to shorest), tarsi I-II moderately swollen ventrally (Fig. 3H-I). Carapace chestnut-red, diamond-shaped, moderately granular. Both parts of the fovea distinct, anterior part long, narrow, deep; posterior part oval, wide, deep.

Cheliceral lamina narrow, distally round. Chelicerae with rather thick, blunt, tooth-like gland mound in distal 1/3 (Fig. 1D).

Opisthosoma oval, purplish grey, with distinct dark pattern of transverse stripes and large median band (Fig. 3D).

Retrolateral side of cymbium with distinct brush formed by thickened setae (Figs 1B, 3C). Tip of palpal bulb occupying one-third of bulb length. Bulb thick, its distal ring long and oval. In ventral view (Figs 1C, 3B), upper part of bulb with inverted droplet-shaped, sclerotized structure. Embolus absent. Sperm entering and leaving palp via membranous upper part of bulb next to droplet-shaped structure.

DESCRIPTION OF FEMALE: TL 5.15-6.20. CL 2.45-2.80, CW 1.65-1.90; OL 2.70-3.40, OW 1.80-2.30. Eye measurements: AME 0.10-0.11; ALE 0.13-0.14; PME 0.11-0.13; PLE 0.10; AME-AME 0.05-0.08; AME-ALE 0.01; ALE-PLE 0.03-0.04; PME-PME 0.09-0.13; PME-PLE 0.03. CH 0.13-0.16. Leg measurements: I 4.75-5.85 [1.65-1.95, 0.95-1.20, 1.10-1.40, 0.50-0.60, 0.55-0.70]; II 4.60-5.50 [1.50-1.75, 0.95-1.20, 1.05-1.30, 0.50-0.60, 0.60-0.70]; III 3.40-4.10 [1.10-1.30, 0.55-0.60, 0.70-0.95, 0.45-0.60, 0.55-0.65]; IV 4.70-5.70 [1.35-1.60, 0.70-0.90, 1.30-1.60, 0.80-0.95, 0.55-0.65].

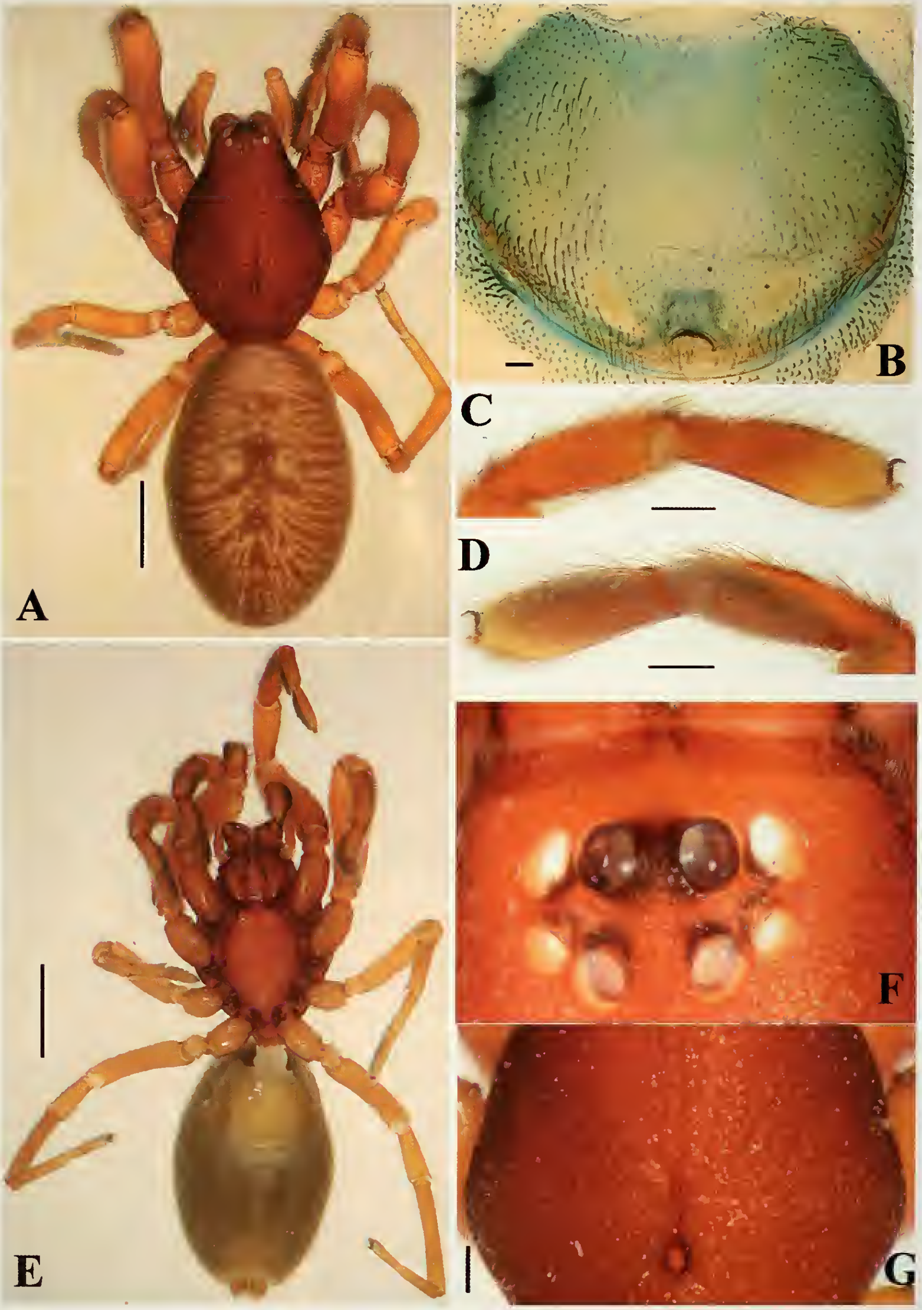

FIG. 2. *Colopea lehtineni* sp. n. female paratype from Xishuangbanna Tropical Botanical Garden. (A) Habitus, dorsal view. (B) Pulmonary plate, dorsal view. (C) Metatarsus and tarsus of leg I, retrolateral view. (D) Same, prolateral view. (E) Habitus, vental view. (F) Eyes, dorsal view. (G) Fovea, dorsal view. Scale bars: A, E = 1 mm; B, C, D, F, G = 0.2 mm.

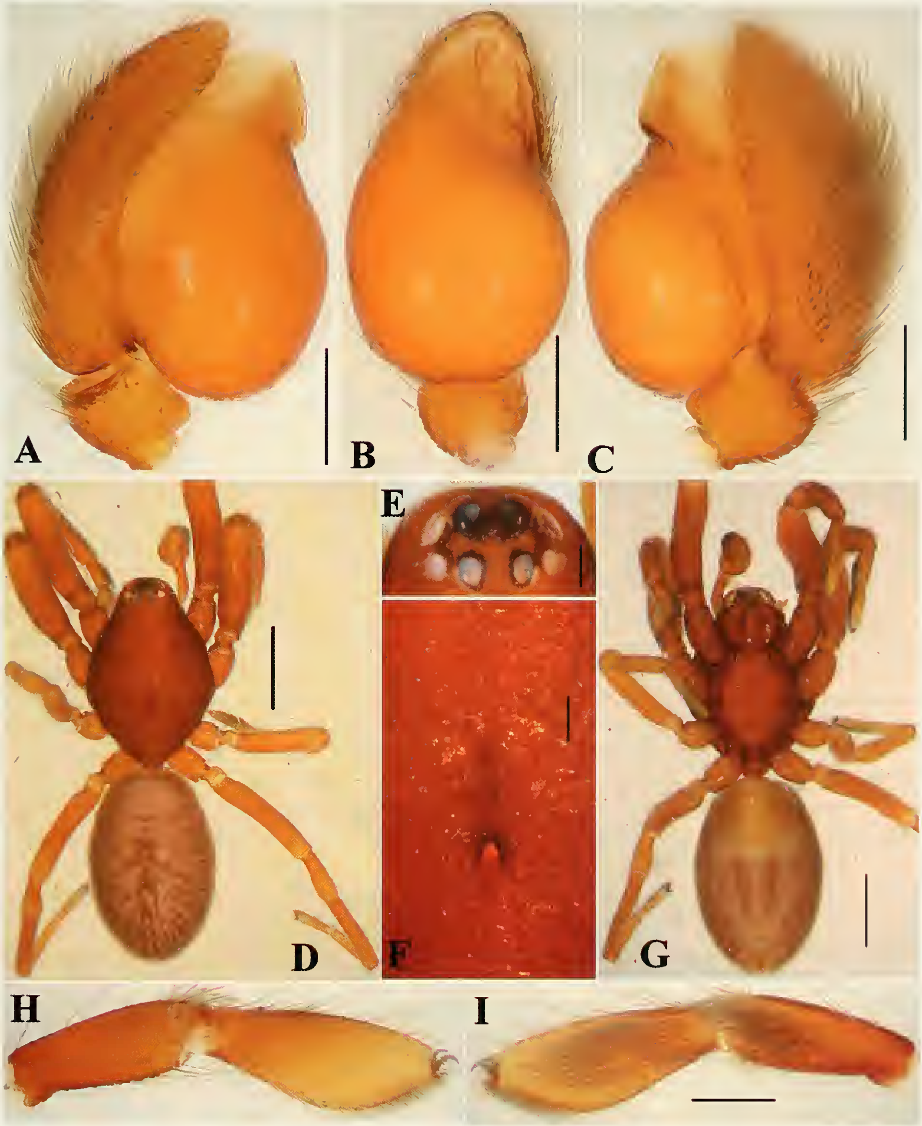

FIG. 3. *Colopea lehtineni* sp. n., male holotye. (A) Left palp, prolateral view. (B) Same, ventral view. (C) Same, retrolateral view. (D) Habitus, dorsal view. (E) Eyes, dorsal view. (F) Fovea, dorsal view. (G) Habitus, vental view. (H) Metatarsus and tarsus of leg I, retrolateral view. (I) Same, prolateral view. Scale bars: A, B, C, E, F, H, I = 0.2 mm; D, G = 1 mm.

Leg formula: I-IV-II-III. Similar to the holotype in all non-genitalic characters, except tarsi I-II ventrally only slightly swollen (Fig. 2C-D).

Vulva with sclerotized median structure (= vulval tube *sensu* Lehtinen, 1982: not corresponding to a spermatheca) with widely rectangular shape (Figs 1F, 2B).

No traces of spermathecae were found in several females studied by using different methods.

DISTRIBUTION: Xishuangbanna rainforest, Yunnan Province, China.

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